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January 14, 2013

Chief of Police Thomas Smith
St. Paul Police Department
367 Groves Street
St. Paul, MN SS101

Re: Review of seventy-three (73) controlled substance cases

Dear Chief Smith:

Schwarz Forensic Enterprises (SFE) is pleased to provide you with this attached report concerning our assessment of seventy-three (73) controlled substance cases that were previously worked by the St. Paul Police Department Crime Laboratory.

SFE was provided with pre-chosen cases that were requested to be reviewed for accuracy of the analytical results reported by the St. Paul Police Department Crime Laboratory. Additional controlled substance cases were chosen while on-site to aid the review of the seventy-three cases

This review provided insight into the quality of the work performed by the unit. This assessment was conducted by Frank Fitzpatrick.

Respectfully Submitted,

Matthew T. Schwarz, CLPE, CPES
President/CEO
Schwarz Forensic Enterprises, Inc.

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Schwarz Forensic Enterprises (SFE) was requested to review seventy-three controlled substance cases analyzed by the Saint Paul Police Department Crime Lab to determine the accuracy of the analytical results.

Conclusion:

There was no evidence of contamination from one case to other cases.

There were nine instances in which the data indicated potential contamination from one item on a case to another item from the same case. That is, when multiple samples are analyzed in a single case, the amount of drug analyzed in an initial sample may carry over to the analysis of the next sample.

With the exception of the nine instances, results reported for all of the other samples appear reasonable.

Methodology:

SFE was presented with copies of files from the aforementioned cases. Typically, these files included:

A report of the examination results as reported to the requestor,

A copy of the notes of the analysis, typically taken on Form 010-CH,

A copy of the gas chromatographic (GC) output, and

A copy of the mass spectral (MS) data.

The GC and MS data are frequently reported on the same sheet. The mass spectral data also includes copies of spectra of known drugs from the mass spectrometer's drug reference library, which had been identified to the submitted drug samples.

The seventy-three reports were examined off-site for concordance among the notes, chromatographic and mass spectral data. The sequence of sample analysis was examined by looking at sequence vial numbers and times of analysis. Many of the cases involved multiple items in a single case. These were especially scrutinized to see if there could be contamination from one item in a case to another item, as well as from one case to another case.

SFE went on-site to examine data on cases for which reports had not been provided but which could, theoretically, influence the results of the seventy-three cases under review. Other meta-data such as sequence logs and solvent logs were also examined. These additional cases were examined to determine

if the amount of drugs in those cases could contaminate the subsequent analysis of one of the seventy-three cases.

The determination of possible contamination in a forensic analysis by examining chromatographic data of submitted items is problematic. Since the content of samples before analysis is not actually known, the controlled substance detected may actually be present and not be contamination. Contamination can only be inferred from looking at adjacent samples to see if some residual carry-over could have occurred.

Discussion:

The nine instances of potential contamination may or may not be actual contamination. However, it was observed that the laboratory practices by the lab to prevent and detect contamination were deficient. Additionally, review of the data indicated other deficiencies in reporting of results and analytical practices.

Other Deficiencies:

Reporting

- Typical reporting of GC/MS analysis or microscopic testing results by the Lab included the phrase, "Examination PROVES the presence of controlled substance....."(emphasis not added). This is unusual reporting since proof is a legal concept and not a scientific concept. Most drug testing laboratory reporting similar results would report that "Controlled substance A was identified in the sample" or "Sample A contains controlled substance B".

  Typical reporting of just single or multiple color tests results by the Lab included the phrase, "Preliminary presumptive examination is POSITIVE for the presence of a controlled substance A ..." (emphasis not added). Few analytical laboratories report controlled substance examination results based upon a presumptive color test. While the phraseology employed by the Crime Lab is technically correct, it is not a rigorous examination required for the prosecution of a case. Most color testing of suspected controlled substances, such as by Narcotics Officers, would form a part of probable cause for an arrest, detention or arraignment. Many drug laboratories employ color tests but only as a screening tool. These tests provide information so that more informed decisions can be made about which various instrumental tests can be employed for the identification of the suspected sample, or to support microscopic examinations.

  However, if all customers of the crime lab (prosecutors, police and defense bar) understood the limitations of this testing, the reporting of the presumptive examination, as above, may be adequate.

- Typical reporting of pharmaceutical compounds includes information about visual and imprint observations of a tablet or capsule. The reported conclusion of the Lab is that the item is consistent with the manufactured drug. This is within standards of practice in the field of drug analysis.

Analytical Techniques

- Commonly accepted laboratory practice, such as promoted by the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG), requires, in part, that at least two scientifically validated tests be necessary for a drug to be conclusively identified. When an instrument such as the GC/MS, which combines two techniques (the gas chromatograph and the mass spectrometer) is employed, both shall be used with sufficient rigor that:

  "In cases where hyphenated techniques are used (e.g. gas chromatography- mass spectrometry, liquid chromatography-diode array ultraviolet spectroscopy), they will be considered as separate techniques provided that the results from each are used."[i]

  In the Lab, the notes accompanying the case indicated that the mass spectrometer results were considered in affecting an identification of a controlled substance; however, there is nothing in the notes to indicate that the gas chromatograph retention times were considered. This may have been done, but is not reflected in the notes. Despite this deficiency, the conclusions drawn from the GC/MS results are reasonable.

Use of Blanks

- In the Lab, there was no indication found in the case files that controls were used during analysis.

  Analytical methods for the analysis of controlled substance requires awareness of the possibility that contamination can be introduced into the analysis by instrumentation employed, past analyses on the instrumentation, and chemicals used in the analysis, among other causes.[ii]

  It is typical to employ the use of blanks or negative controls for this purpose. Many analytical schemes will require a blank solution (i.e., a liquid known to be drug free) be used before each case is analyzed in the GC/MS. This procedure helps to ensure that no residual drugs are present from a previous case. In cases in which low intensity samples are suspected, it is good laboratory practice to inject a blank solution in between each sample, even on the same case, to determine if any residual substances are present and to act as a scavenger to dilute or remove the residual substance. There was no indication that these controls were used during analysis.

Summary

The Saint Paul Police Department Crime Lab did not appear to follow good laboratory practices, in general, and SWGDRUG guidelines, specifically, in the analysis of controlled substances.

With the exception of the nine instances of possible contamination, the analytical conclusions reached on the seventy-three cases appear reasonable. There were numerous cases in which no drug was detected in a sample, and in which the resulting chromatograph and mass spectral results were free of signs of contamination. This would indicate that actual contamination was not a substantial problem, in general, although it may have been a problem in specific cases.

The resumption of controlled substance analysis should be contemplated only after adoption of quality assurance standards and good laboratory practices.

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[i] Section 3.7 Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Recommendations, http://www.swgdrug.org/Documents/SWGDRUG Recommendations 6 .

[ii] The gas chromatograph and mass spectrometer (GC/MS) are two instruments combined together to identify chemicals. The GC instrument separates mixtures of chemicals into separate chemicals. Each of these chemicals are separately subjected (in the MS instrument) to a beam of energy which fragments the chemical into different ion weights, depending upon what the composition of the molecules making up that chemical. These ion fragmented are characteristics of specific chemicals.
Drugs are typically analyzed by dissolving the powder, liquid or solid, into a solvent, for example, methanol, to place the suspected compound into a solution. This solution is placed into a small vial, typically 2-3 milliliters in volume. This vial is then added to a tray which can contain up to 100 vials, however, it is not necessary to fully load the tray to begin analysis. Case information is added through a data system connected to the GC/MS. Computer control allows the vial location to be associated to a specific case and item.
For analysis, the vial moves to a particular location and a syringe inserts its needle into the vial, withdraws a small aliquot of liquid, moves to a location over the injection port of the gas chromatograph and injects the liquid into the gas chromatograph. The injection port heats the solution into a gas. The gas chromatograph has a thin, heated tube that aids in the separation of chemical mixtures into separate compounds. The end of the thin tub leads to the mass spectrometer.
Depending upon the analytical methods programmed into the controlling computer. The syringe can now be washed by cycling liquids into and out of the needle. Additionally, the syringe can be programmed to inject a pristine liquid (the blank) into the GC to ensure that no residual substances are present in any part of the instrumentation. After analysis is completed, copies of the GC results and copies of the MS results are available for review. Both results remain within data files in the GC/MS data system.